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Cybersecurity Guide for Distributed Wind Presentation

May 2021

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Changing the World's Energy Future

Idaho National Laboratory

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Cybersecurity Guide for Distributed Wind

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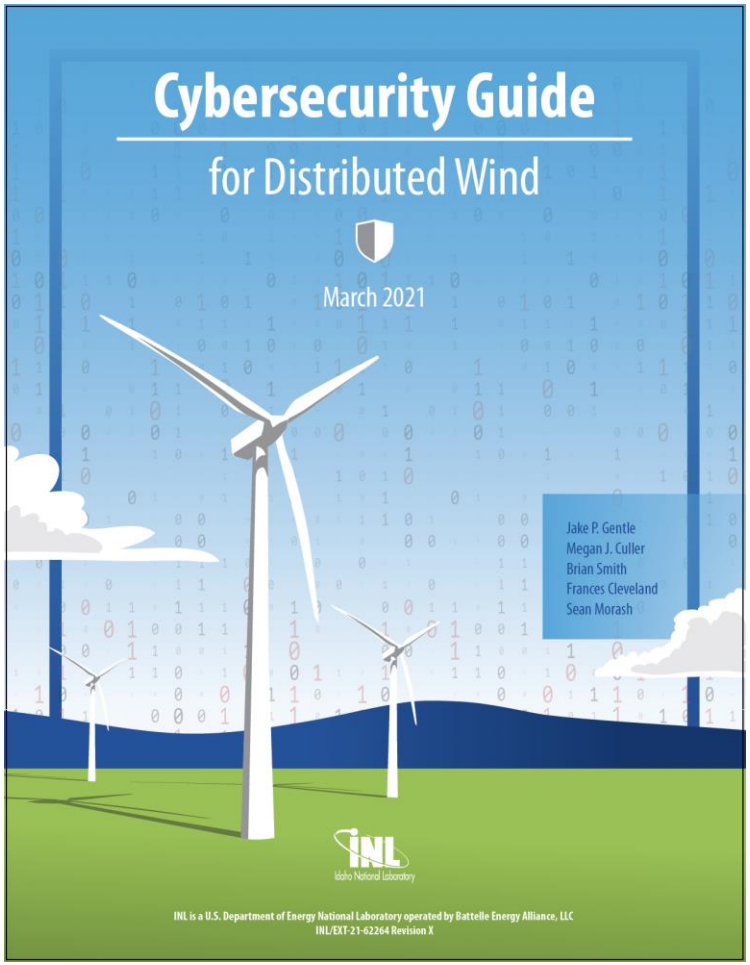
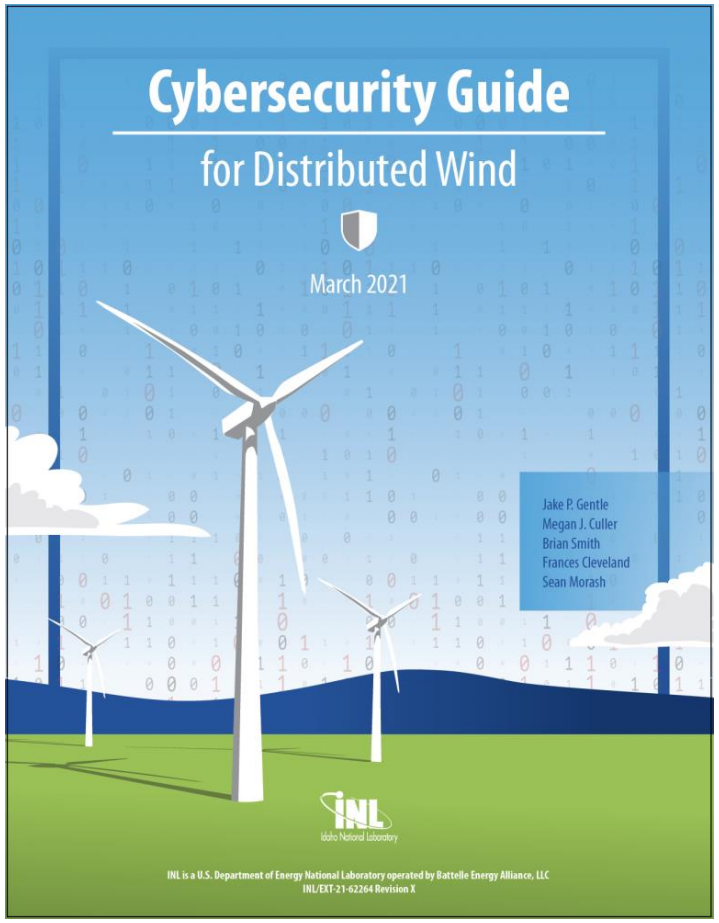
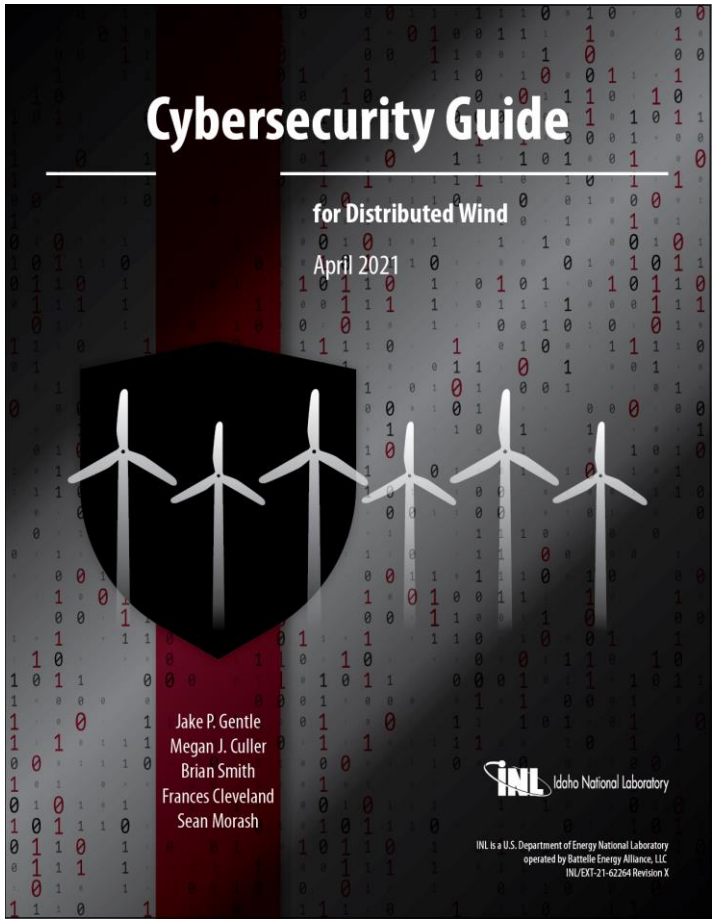
Goals

- Motivate need for cybersecurity for distributed wind
- Explain unique challenges of cybersecurity for distributed wind
- Recommend best practices for cybersecurity for distributed wind stakeholders

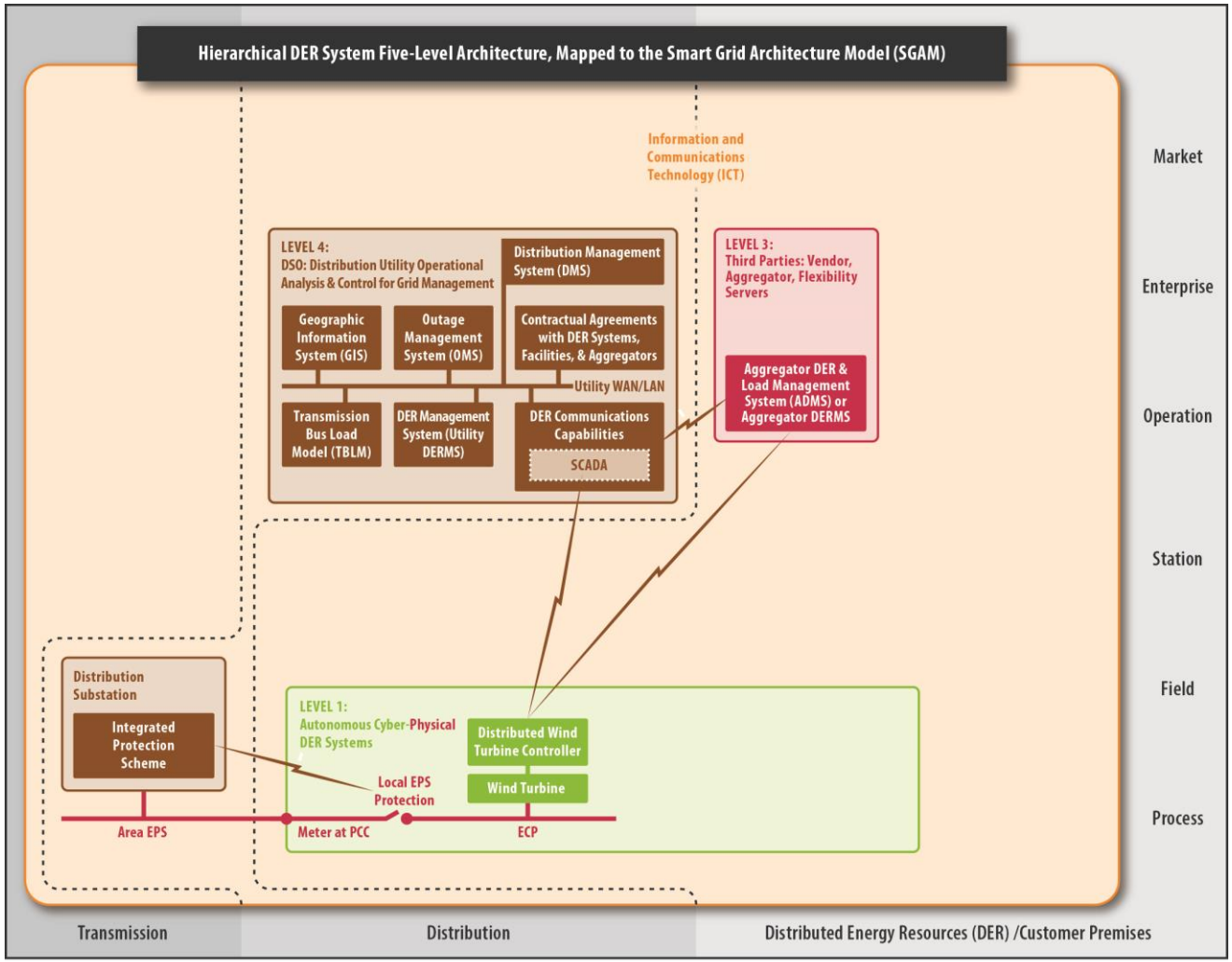


Which cover page do you prefer?!

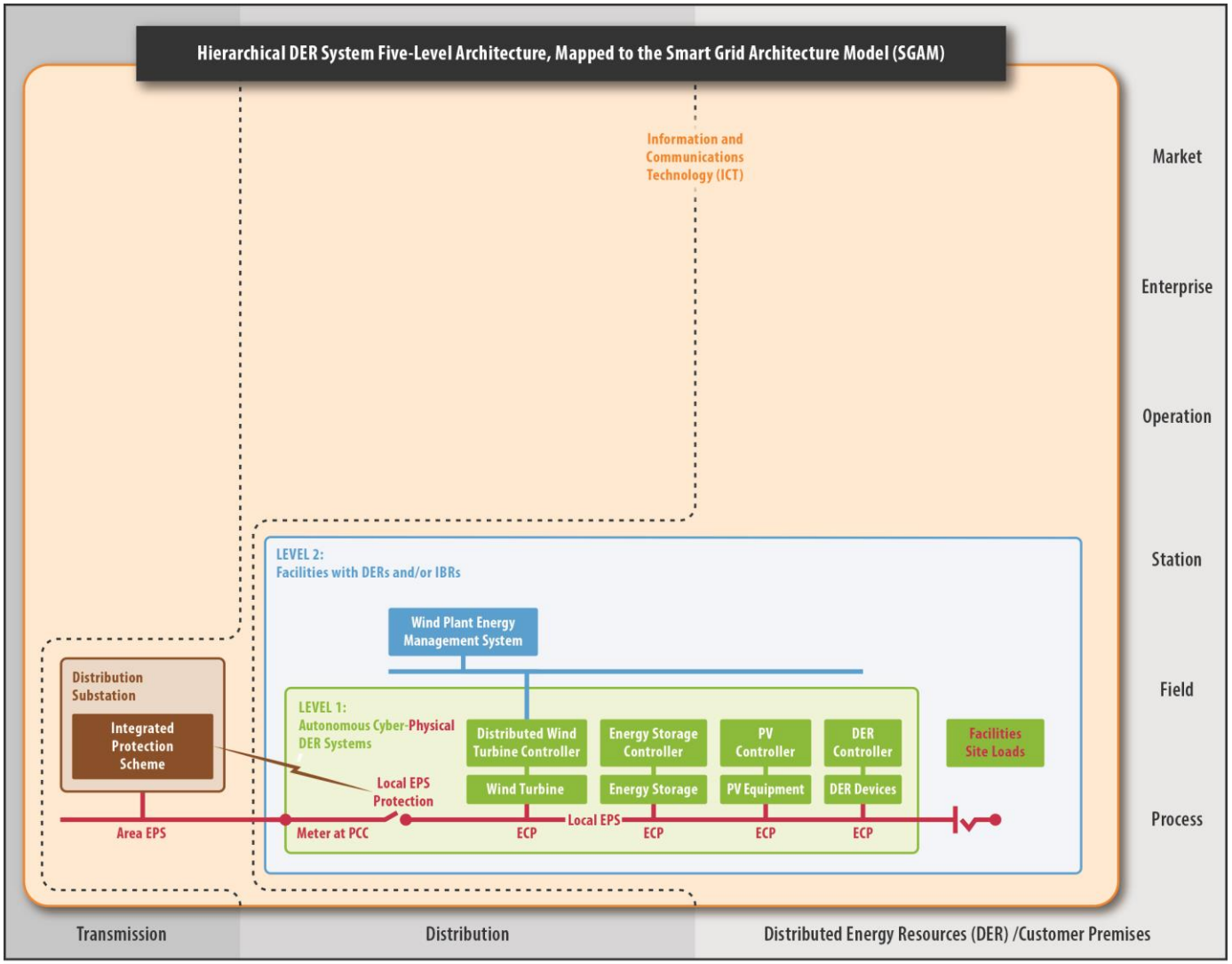




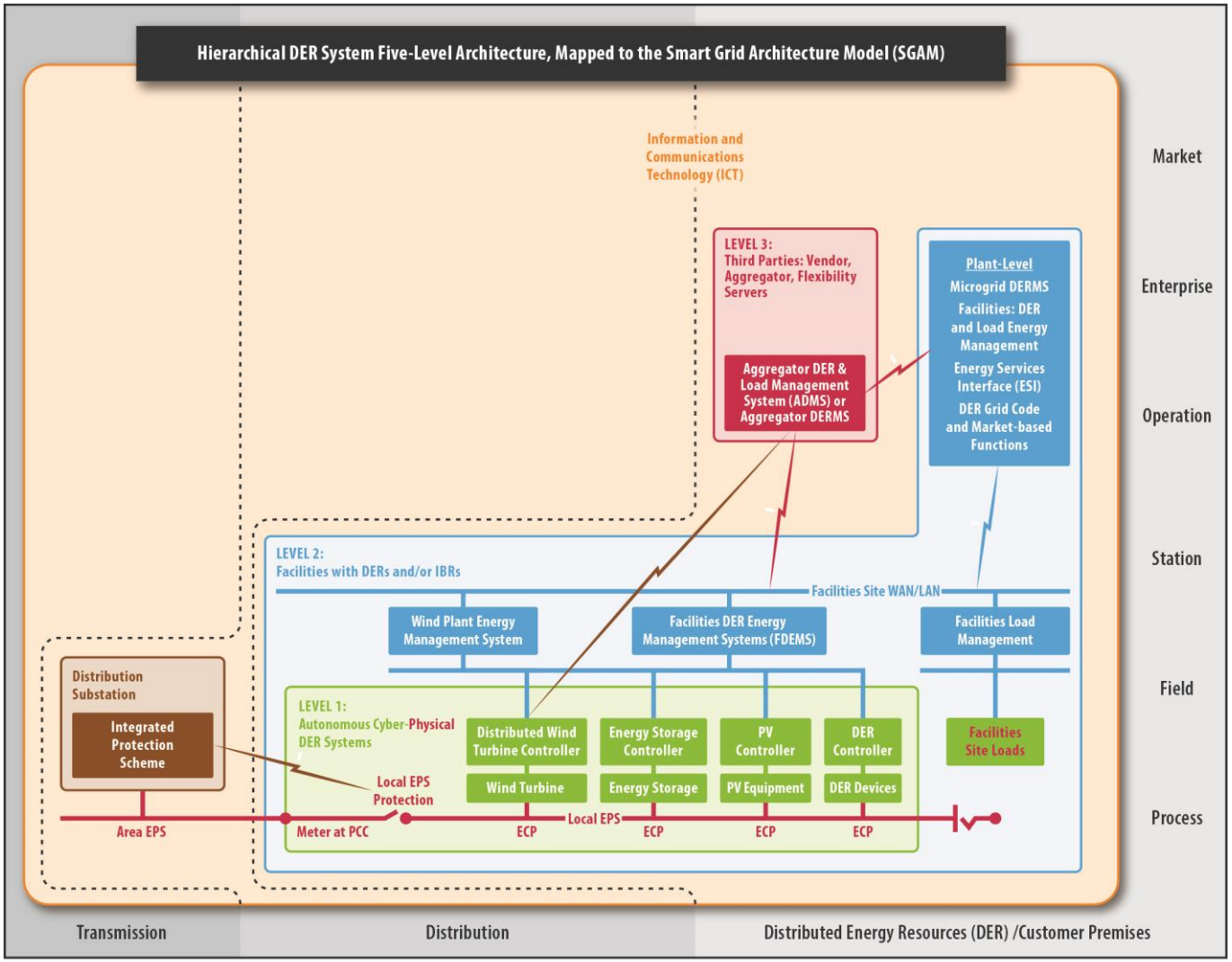
Distributed Wind Architectures: Front-of-the-meter



Distributed Wind Architectures: Behind-the-Meter



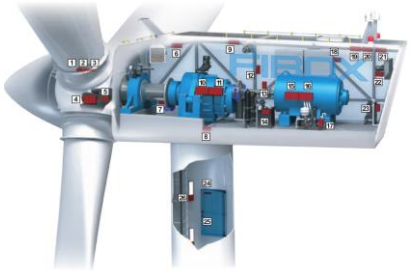
Distributed Wind Architectures: Microgrid, Off-grid potential



Need for Cybersecurity

Shifting wind energy design landscape demands altered cybersecurity paradigm

Cyber threats to wind energy technology have been established and demonstrated



Distributed wind turbines have many applications, not all stakeholders may be familiar with ICS cybersecurity practices

Lack of standards and guidelines for distributed wind

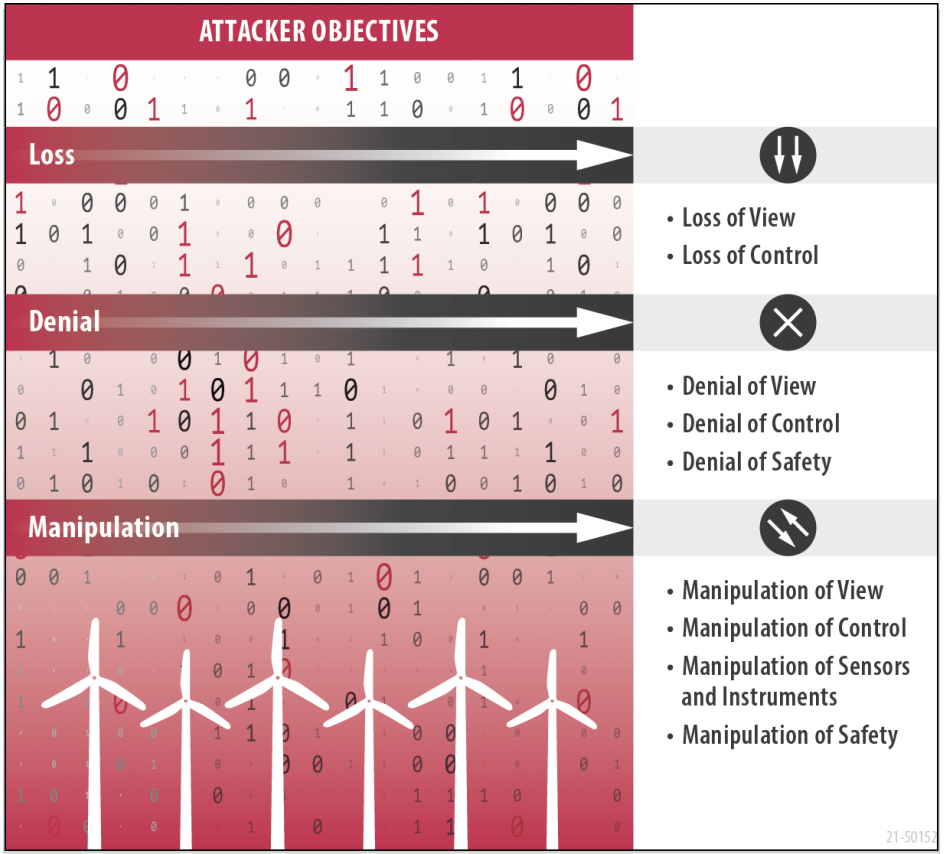
Images:
https://www.fiboxusa.com/enclosures-for-wind-power/ ‘
https://www.spower.com/index.php
https://www.ge.com/digital/sites/default/files/download_assets/GE-Digital-Wind-Cyber-Security-Brochure.pdf
https://keelsolution.com/blog/why-implementing-rds-pp-standards-lowers-wind-turbine-operations-and-maintenance-cost/

Challenges for Cybersecurity for Distributed Wind

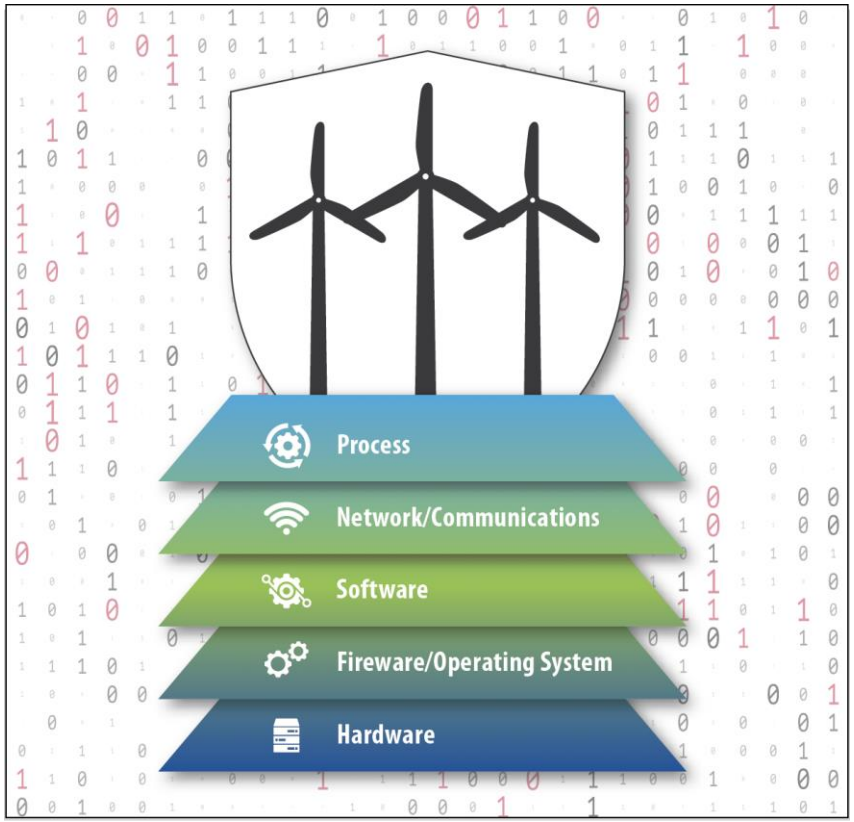
- Different protocols
- Remote monitoring
- Rise in ICS cybersecurity incidents
- Supply chain and lifecycle monitoring
- No one-size-fits-all solution
- Lack of standards
- Few incentives to prioritize cybersecurity
- Limited threat sharing
- Lack of market offerings that consider security
- Many stakeholders and personnel involved

Threats, Adversaries, and Objectives

- Basic Hacker
- Disgruntled Insider
- Organized Group
- Hostile Nation-State or Terrorist



Vulnerabilities and Attack Vectors



- Vulnerabilities may occur at any of the process layers
- Vulnerabilities are building blocks of an attack vector
- Many individual vulnerabilities could be exploited to obtain the same end goal

Key Recommendations

RA

- Risk assessment and management recommendations

NE

- Communication network engineering recommendations

AC

- Access control recommendations

DS

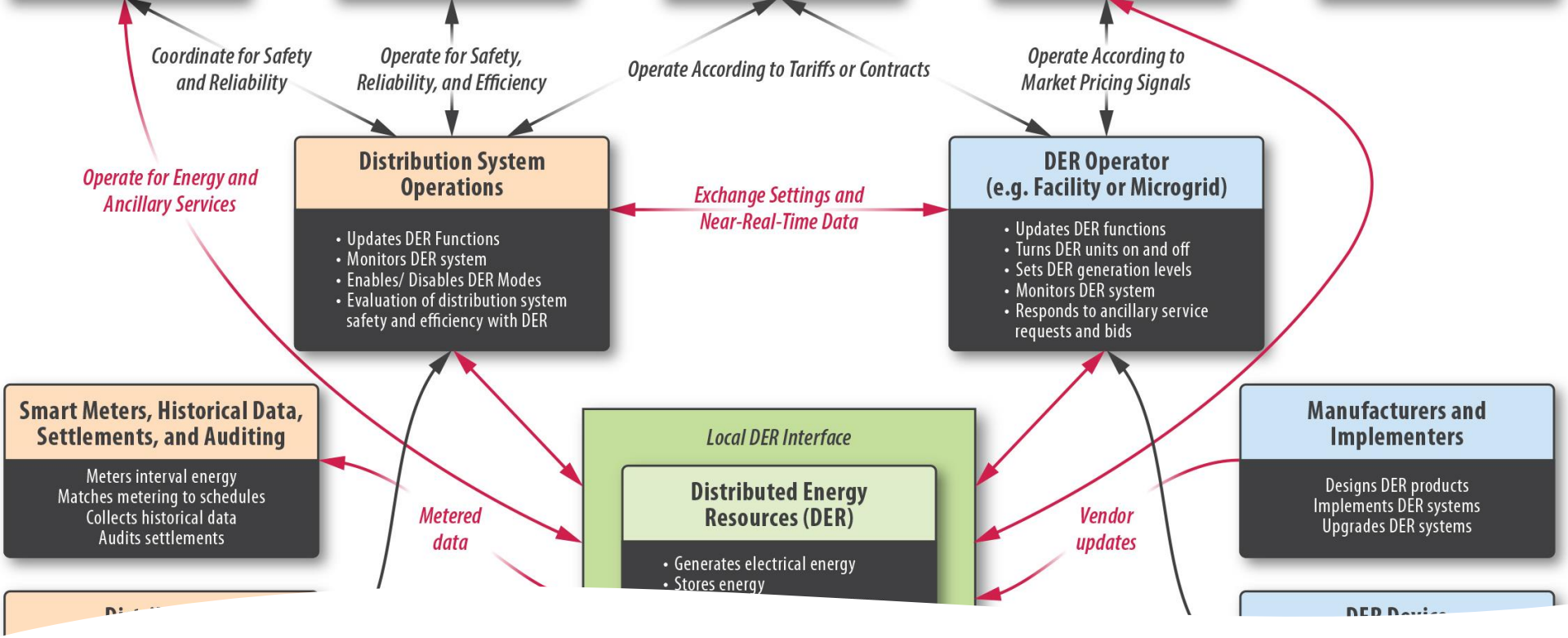
- Data security recommendations

SM

- Security management recommendations

CM

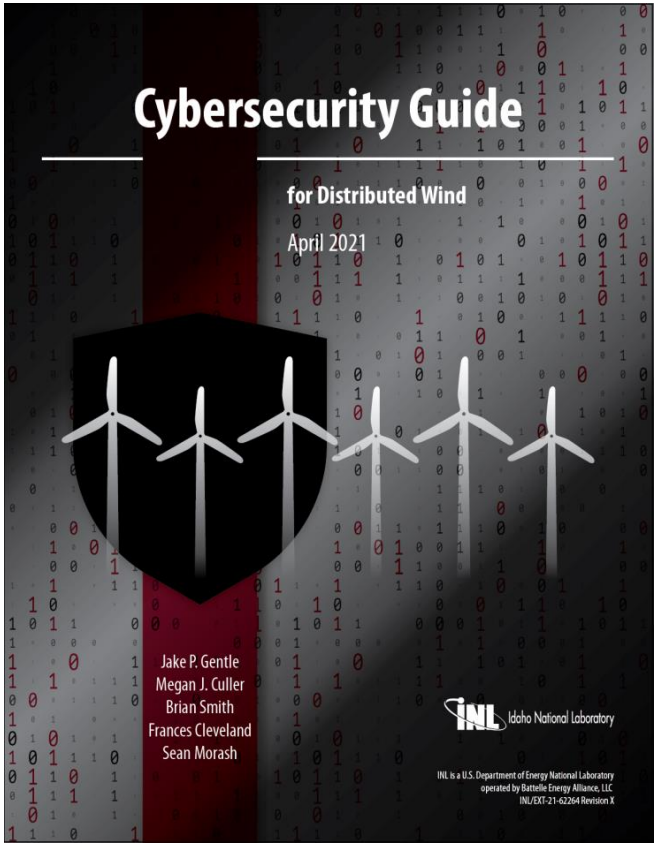
- Coping with and recovering from security events recommendations



Stakeholder Roles

- Distributed wind manufacturers
  - Design of autonomous capabilities to account for cyber mishaps
  - Secure design to IEEE 1547 communication requirements
  - Data validation built in
- Distributed wind integrators and installers
  - Cybersecurity contract in place
  - Proof that all cybersecurity requirements are met
  - Appropriate cybersecurity measures are enabled during installation
  - User's password must change before turbine turned on
- Distributed wind operators who could be facility (owner) operators, utility operators, aggregator operators, or other third parties
  - Protect data confidentiality
  - Ensure RBAC authorization in place

Thank you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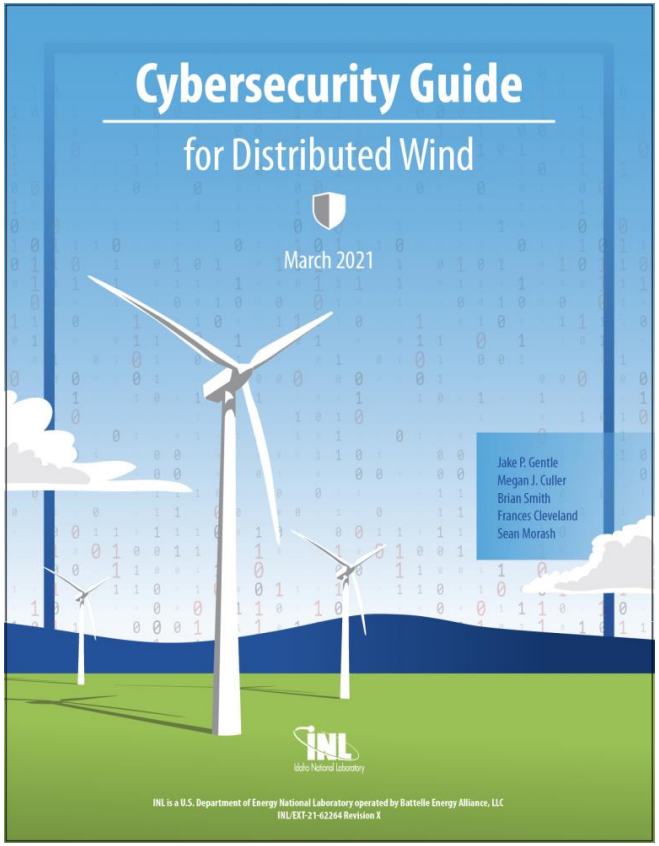
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